CNC MILLING SETUPS AND OPERATIONS
Course Syllabus

Course Number: NCMT-1695
OHLAP Credit: No
OCAS Code: None
Course Length: 80 Hours
Career Cluster: Machining
Career Pathway: Production
Career Major(s): Certified Machine Technician

Pre-requisite(s):
Upon the completion of this course the student will have gained the knowledge of computer numerically controlled (CNC) machine modes depicting the work coordinate system (WCS) and be aware of its relationship to the machine coordinate system (MCS); will comprehend the homing procedure and value its purpose, along with work piece and tool geometry offsets; will be able to enter and activate programs into the CNC control while safely establishing a CNC program on a lathe.

Textbooks: Instructor developed curriculum – on Blackboard site

Course Objectives:
A. Describe CNC Machine Modes for CNC Milling
   1. Home the machine using zero reference return.
   2. Input data using manual data input (M.D.I.)
   3. Use edit mode to alter a program.
   4. Manually move the machine using various jog modes
   5. Run a program from memory mode

B. Describe the Work Coordinate System (WCS) for Milling
   1. Cartesian coordinate system applied on a CNC mill.
   2. Location of the work piece origin
   3. Manipulating the milling WCS

C. Describe the Machine Coordinate System (MCS) for Milling
   1. Location of the MCS
   2. Offsetting the MCS
   3. Purpose of the MCS

D. Understanding the Homing Procedure and Purpose.
   1. First step
   2. Machine variations
   3. MCS relevant to machine home
   4. Steps of the homing procedure
   5. Why home the machine
   6. Machines that don’t home

E. Importance of Work Piece Offsets for CNC Milling
   1. Steps for setting a work offset
2. Work piece setup procedure
3. G54-G59 and/or work shift
4. Shortcut keys for setting workpiece offsets
5. Fixture offset page

F. Describe Tool Geometry Offsets for CNC Milling
   1. Setting geometry offsets
   2. Using wear offsets
   3. Working with cutter radius compensation offsets
   4. Geometry offset page
   5. Wear offset page
   6. CRC offset inputting.

G. Entering and Activating Programs into the CNC Control
   1. Front end processors for uploading
   2. Removable media for uploading
   3. RS232 Serial communications for uploading
   4. Storage of programs
   5. Recalling programs into memory

H. Learn How to Safely Prove-out a CNC Program on a Mill
   1. Auto/Memory mode of operation
   2. Dry run explained
   3. Override capabilities
   4. Graphic simulations
   5. Safe offset
   6. Single block

NIMS/ODCTE objectives

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.
Available Certifications/ College Credit

The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility:

The student must maintain a grade point average of 2.0 or better.